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### Abstract of the Disclosure

There are provided a resonator for use in a filter, which interprets and reduces intermodulation distortion by analyzing characteristics of current density occurring at resonance and linear and nonlinear characteristics of the filter, a method for manufacturing filters by using the resonator and a filter manufactured by the method. The resonator has a ratio of an inside diameter to an outside diameter belonging to a range which is larger than about 1 : 3 and smaller than or equal to about 1 : 3.75 and its length (H) is about  $\lambda/4$ , wherein  $\lambda$  is a wavelength of a plane wave provided to the resonator. By employing the method, it is possible to effectively design the filters through the use of a circuitry and structural approach with breaking from a conventional approach depending on local and minute processing steps when manufacturing the filters.